

APPROACH FOR DEVELOPING A TOTAL MAXIMUM DAILY LOAD (TMDL) FOR GARDEN CREEK, BUCHANAN COUNTY, VIRGINIA

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Civil & Environmental Consultants, Inc.



Background

- Total Maximum Daily Load (TMDL) describes the amount of pollution a stream can receive and still meet water quality standards (WQS).
- TMDL identifies sources of pollution and reductions needed to attain WQS.
- TMDLs required for water bodies that are determined to be impaired (VADEQ 2004 303(d) List).
- Consol working cooperatively with DMME and VADEQ to develop the TMDL.



Background (Cont'd)

- TMDLs are required by the Clean Water Act (CWA) to contain the following eight elements:
 - Developed to meet WQS
 - Contain a wasteload allocation for permitted point sources and nonpoint sources (NPS)
 - Contain a margin of safety (MOS) for uncertainties
 - Developed for critical stream conditions (e.g., 7Q10)
 - Consider seasonal variations
 - Consider background contributions
 - Be subject to public participation
 - Contain reasonable assurance for implementation of NPS load allocations



Background (Cont'd)

- Garden Creek (Hydrologic Unit 05070202 AND TMDL ID VAS-Q04R-02) is listed as being impaired by total fecal coliforms and general standard (benthics) and not supporting the recreation use and aquatic life use, respectively.
- The impaired segment covers 1.82 miles and extends from the Right Fork confluence to the Levisa Fork confluence.
- The impairment sources are from urban NPS and habitat alteration (VADEQ 2004 303(d) List).
- Land uses in the watershed, resource extraction, and dense population along the stream are listed by VADEQ as contributors to impairment.
- The TMDL development date is listed as 2008.



Proposed TMDL Approach

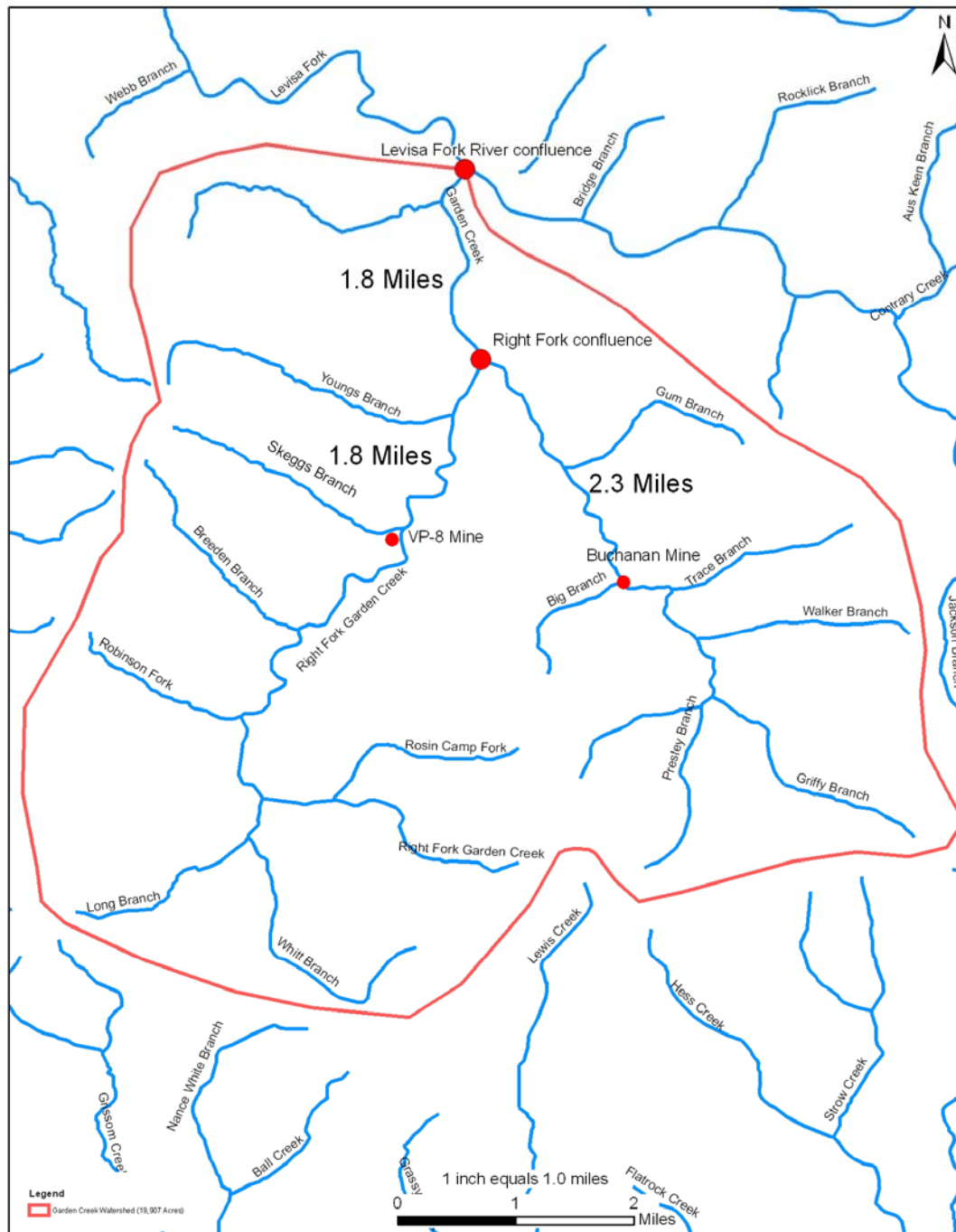
- Prepare a TMDL Study Report in 2007
- The Study Report will include the following:
 - Background information on the Garden Creek watershed (location, size/drainage area, stream order, land uses, watershed maps)
 - Applicable WQS (The Consol TMDL Report will address General standard-benthics impairment and VADEQ will likely prepare a separate TMDL for the total fecal coliform impairment)



Garden Creek Land Use

Land Use/Cover	Approximate Acres	Percent of Watershed
Open water	11.3	0.06
Residential	71.2	0.36
Commercial/Industrial	109.6	0.55
Strip mines/quarries	314.0	1.58
Transitional (<25% cover	172.1	0.86
Forest	18,835.4	94.62
Pasture/crops	392.3	1.97
Total	19,906	100.0





Proposed TMDL Approach TMDL TMDL Approach (Cont'd)

- Stressor identification - collect and review of existing water quality, hydrologic, sediment quality, habitat, and benthic assessment data to determine the pollutant(s) which are likely causing the impairment.
- Description of pollutant sources (Point source and NPS loads on an annual and/or seasonal basis) and modeling, if employed
- Allocation results and load reductions to meet the appropriate WQS (include cost, benefits, and environmental impact of addressing impairment)



Schedule and Deliverables

- Consol selected the team of CEC, MapTech, and EMI in April 2006 to perform the study
- Initiated field collection activities in April 2006: benthic macroinvertebrate, habitat, surface water, and flow at 5 locations
- Sediment sampling - early May 2006
- Monthly flow monitoring - April-December 2006



Schedule and Deliverables (Continued)

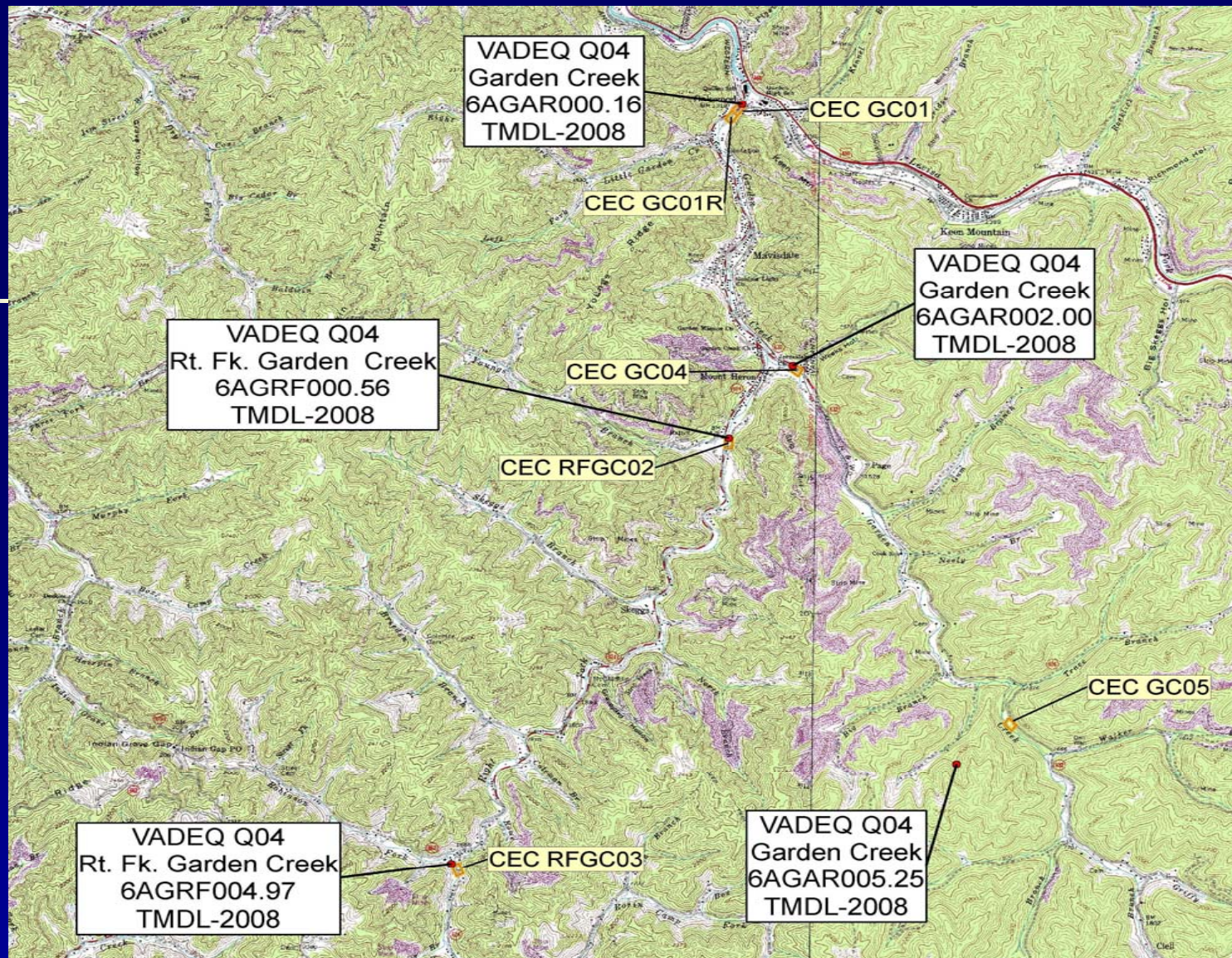
- Comprehensive surface water and sediment sampling being performed in spring and fall 2006
- Obtaining and reviewing historic and recent VADEQ, DMME, and other data
- Public meeting to overview TMDL process and provide information on data collected to date and stressor identification in November 2006
- Public meeting to present load allocations and study results in late January or early February 2007



Schedule and Deliverables (Continued)

- Draft TMDL Study Report - February 2006
- Final TMDL Study Report - March 2007
- Prepare TMDL Implementation Plan - 2008
- Implement the Plan - 2009









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Preliminary Benthic Results Spring 2006

VADEQ Location	VASCI Score	CEC Location	VASCI Score
6AGAR000.16	33.4	GC01	36.4
6AGRF000.56	29.6	RFGC02	41.9
6AGRF004.97	41.0	RFCG03	41.6
6AGAR002.00	48.3	GC04	56.2
6AGAR005.25	52.0	GC05	63.7



Preliminary Habitat Results Spring 2006

VADEQ Location	Habitat Score	CEC Location	Habitat Score
6AGAR000.16	134	GC01	138
6AGRF000.56	142	RFGC02	146
6AGRF004.97	124	RFCG03	105
6AGAR002.00	143	GC04	145
6AGAR005.25	160	GC05	156



Preliminary Habitat Results Spring 2006

Habitat Metric	6AGAR000.16	GC01
Bank stability	14	13
Bank vegetation	9	11
Channel alteration	13	12
Embeddedness	19	17
Epifaunal substrate	18	14
Flow	13	15
Pool sediment	7	15
Riffles	17	18
Riparian vegetation	9	9
Velocity	15	14
Total	134	138

